JUNO Transforming Evidence for Agriculture, Food and Climate

THE STATE OF THE FIELD FOR RESEARCH ON AGRIFOOD SYSTEMS: A SUMMARY FOR POLICYMAKERS

CHALLENGES

Agrifood systems need a makeover. They need to become more climate-friendly, sustainable, and equitable, to be able to provide affordable and nutritious food for all.

These ambitious goals require coordinated actions at local, national, and international levels. The converging challenges of hunger, climate change, and consequent political unrest call for urgent attention.

However, the science on agrifood systems is scattered, hindering policymakers' ability to effectively translate scientific solutions into the best policies, strategies and actions.

THE JUNO EVIDENCE ALLIANCE SOLUTION

The Juno Evidence Alliance has pioneered an artificial intelligence (AI)-driven approach to summarize research trends and outcomes across agrifood systems and identify new insights from existing data.

INSIGHTS

Research interventions would benefit from being guided by a broader research strategy

Sustainable production of crops, livestock, aquaculture and forestry interventions have resulted in sustainable economic growth, but they fall short when it comes to fostering inclusivity and gender equity.

Crop breeding technologies interventions are linked with regulatory approvals of new crop varieties and legislative hurdles in trading and sharing seeds and plants. Research in this area prioritizes the technological impact on economic growth, food security and nutrition, leaving environmental outcomes less well-studied.

Food processing and storage interventions are mostly aimed at reducing food loss due to poor infrastructure, knowledge, and food handling. However, interventions aimed at environmental outcomes of food loss are studied less than food security and nutrition.

Interventions that combine agricultural advisory and extension services to change farmers' behaviour often neglect to prioritize behaviours that improve environmental health.

Interventions to improve food security and nutrition for young people and children often only focus on outcomes related to dietary intake through nutrition programmes like school meals. Focusing research on consumer preferences and market forces (demand side) can better identify the diverse needs of everyone involved in the food system.

Interventions to improve income within agrifood value chains are plentiful, but further research is required to ensure that other outcomes receive equal focus. These include food security, nutrition and environmental sustainability.

RESEARCH INTERVENTIONS AND TOPICS THAT SHOULD BE STUDIED MORE

Livestock, fisheries, food storage and processing interventions are still limited. Data on environmental health outcomes in these areas are also scarce, particularly regarding the adoption of eco-friendly pest and disease management.

Aquaculture, livestock, forestry and integrated and diverse farming interventions are, unlike research in crops, limited. Additionally, the lack of research outside of crops hampers wider adoption

of integrated and diverse farming practices that show promise for improving farm yields and environmental health.

Research is also limited on:

- **fruit, vegetable and legume value chains**.
- **countries vulnerable to climate change and hunger**.
- **small-scale farmers in the poorest, hungriest and most climate-vulnerable countries, as well as on children and mothers in rural communities**. However, researchers from these countries are twice as likely to involve farmers, mothers and rural communities in their studies compared to researchers in wealthy nations.

SPECIFIC RESEARCH INSIGHTS

Interventions to improve food sanitation and safety span many categories, including food processing and storage, regulations and public health, all focusing on food security and better nutrition.

Interventions in rural and public infrastructure highlight some of the underlying issues that hinder the use of big data and data analytics for on-farm support and other data-driven services in rural communities, including digital agriculture.

OUR RECOMMENDATIONS

Invest in:

- collaborative (diverse stakeholders) and multi-dimensional (multidisciplinary research) solutions
- better data collection or continuous education for scientists
- data sharing and communication platforms for scientists and practitioners
- AI (like the Juno Evidence Alliance approach in summarizing research literature) and outcomes-based research that both lead to easier agrifood system research and policy agendas.

Prioritize:

- investment in women-led research.

Support:

- participatory, inclusive (diverse farmer communities and women in rural communities) agrifood systems research
- scientific research that reflects diversity (research from low- and middle-income countries, scientific journals with diversified editorial boards and research topics that deal with diversity).

WHAT WENT INTO THIS PROJECT?

We analysed over 6.3 million scientific titles and summaries, from 35,000 academic journals and unpublished “grey” reports. This covered research from 2010 to 2023 in a range of relevant fields.

The data were collected from the CAB Abstracts database and analysed using large language models (LLMs) fine-tuned for agriculture and related fields alongside generative AI. Finaly, our experts performed an in-depth review.

We received financial support for the project from FCDO and the Gates Foundation.

GLOSSARY

Agrifood system transformation: A transformation of agrifood systems for universal access to affordable, nutritious and sustainably produced food, while promoting fair livelihoods.

Artificial intelligence: The ability of computer systems to perform tasks typically requiring human intelligence.

Evidence synthesis: The process of combining information from multiple scientific studies investigating the same topic to comprehensively understand their findings (Cochrane, 2023) .

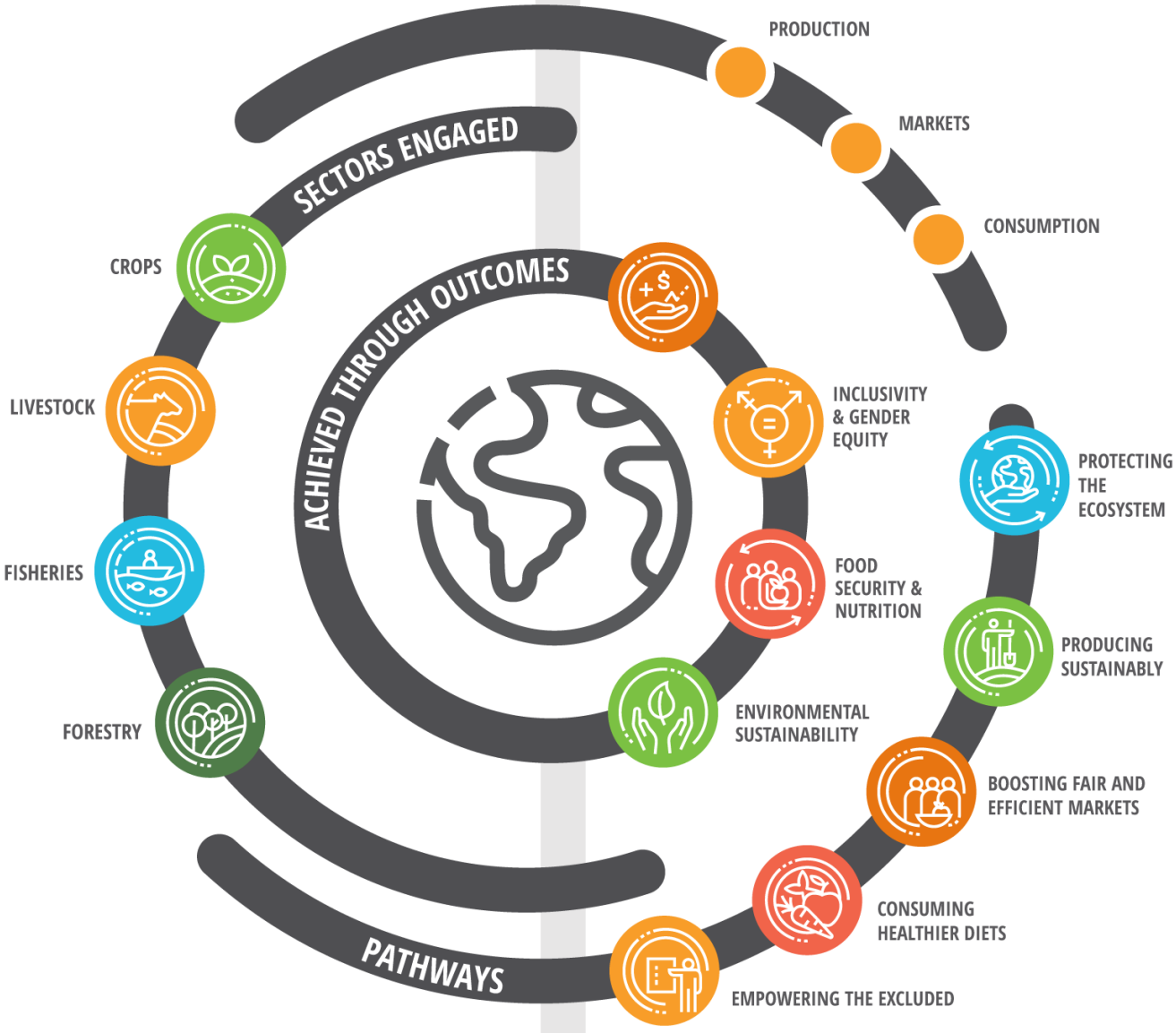
Interventions in scientific study: A specific action or change (e.g. new methods used in farming) deliberately introduced by researchers. These interventions are implemented to observe their impact on a particular outcome.

Outcomes in scientific study: Measurable effects tracked to understand how an intervention or exposure impacts the researched topic (society, community, environment, human health, etc.)

The Juno Evidence Alliance is dedicated to advancing evidence-based approaches to address complex challenges within agrifood systems. Through rigorous research synthesis and collaborative partnerships, Juno endeavours to inform policy and practice, driving meaningful change on a global scale.

COMMITMENTS AND TARGETS TO ENDING HUNGER AND REDUCED EMISSIONS BY 2030

- 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT
- UN FRAMEWORK CONVENTION ON CLIMATE CHANGE AND THE PARIS AGREEMENT
- KUNMING-MONTREAL GLOBAL BIODIVERSITY FRAMEWORK
- UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION



COMMUNITIES IMPACTED

- WOMEN FARMERS
- MOTHERS AND CHILDREN
- INDIGENOUS PEOPLE
- SMALLHOLDER FARMERS AND FAMILIES
- SMALL-AND-MEDIUM-SIZE ENTERPRISES (SMEs)

CONCEPTUAL FRAMEWORK

FIND OUT MORE: WWW.JUNOEVIDENCEALLIANCE.ORG

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